

What is claimed is:

1. An electromechanical apparatus, comprising:
  - (a) a vehicle wheel adapted for axial rotation;
  - (b) a pendulum mounted to rotate freely relative to the axis of rotation for the vehicle wheel;
  - (c) a magnetic element mounted with and positioned by the pendulum;
  - (d) a least a first generator coil mounted to the wheel for rotation with the vehicle wheel to pass through lines of flux associated with the magnetic elements;
  - (e) a current utilization circuit mounted on the vehicle wheel and connected to at least the first generator coil.
2. An electromechanical apparatus as claimed in Claim 1, wherein the magnetic element comprises a plurality of magnets oriented so that their magnetic poles alternate in direction with adjacent magnets.
3. An electromechanical apparatus as claimed in Claim 1, further comprising a plurality of electrical coils mounted on the vehicle wheel.
4. Our electromechanical apparatus as claimed in Claim 2, further comprising:
  - (a) an air pump.
5. An electromechanical apparatus as claimed in Claim 4, wherein the pump is a magnetic button pump.
6. An electromechanical apparatus as claimed in Claim 4, wherein the pump is a solenoid pump.
7. An apparatus for monitoring physical variables of a tire and an axle, the apparatus comprising:
  - (a) a vehicle wheel having a hub mounted for rotation on the axle, the tire being mounted thereon;
  - (b) a tire pressure gauge mounted on the vehicle wheel in communication with the tire;
  - (c) a tire temperature gauge mounted on the vehicle wheel adjacent the tire;
  - (d) an axle temperature gauge mounted on the vehicle wheel adjacent the wheel hub;
  - (e) a signal processor and transmitter mounted on the vehicle wheel and connected to the tire pressure gauge, the tire temperature gauge and the axle temperature gauge for collecting

data from the gauge and broadcasting a radio signal comprehending values representing the data; and

- (f) an energization assembly including a magnetic element mounted adjacent the vehicle wheel presenting at least one magnetic pole parallel to the vehicle wheel's axis of rotation, a field coil mounted on the vehicle wheel to pass the magnetic pole periodically to induce excitation therein, and electrical filtering and supply circuitry connected to the field coil and to the signal processor and transmitter.

8. An apparatus as claimed in Claim 7, wherein the magnetic element further comprises a positioning segment depending from the wheel hub and a stabilizing element for resisting rotation of the positioning segment with the vehicle wheel.

9. An apparatus as claimed in Claim 8, wherein the positioning segment includes a mounting plate centered on the axis of rotation of the vehicle wheel; a low friction bearing centering the mounting plate on the hub;

10. An apparatus as claimed in Claim 9, wherein the stabilizing element includes an off center weight attached to the mounting plate providing inertial resistance to rotation of the mounting plate.

11. An apparatus as claimed in Claim 10, wherein the magnetic element comprises:

- (a) the mounting plate being a disk mounted to have major opposed surfaces perpendicular to the axis of rotation of the vehicle wheel; and
- (b) a plurality of magnets shaped as wedges and arranged circumferentially around the outer edge of the major surface of the disk closer to the vehicle wheel with their poles oriented to alternate with adjacent magnets.

12. Apparatus comprising:

- (a) a vehicle wheel having an axis of rotation;
- (b) a magnetic element positioned adjacent the vehicle wheel and oriented with respect to the vehicle wheel to project lines of flux;
- (c) a generator coil mounted with respect to the vehicle wheel to rotate therewith, and to intercept the line of flux;

(d) electrical utilization elements mounted with respect to the vehicle wheel to rotate therewith and connected to the generator coil to receive energization therefrom.

13. Apparatus as claimed in Claim 12, wherein the magnetic field source further comprises:
- (a) a free wheeling plate having a major surface, rotatably mounted with respect to the vehicle wheel and positioned so that a major surface lies parallel to the vehicle wheel and perpendicular to the axis of rotation of the vehicle wheel; and
  - (b) a plurality of magnets mounted on the major surface of the plate and oriented to present poles of alternating magnetic polarity outwardly from the major surface.
14. Apparatus as claimed in Claim 13, wherein the electrical utilization elements include sensors and an air compressor.
15. Apparatus as claimed in Claim 14, further comprising an air compressor mounted to rotate with the vehicle wheel and energized by the generator coil.
16. Apparatus as claimed in Claim 15, an air compressor mounted with respect to the vehicle wheel to rotate therewith and oriented to be directed activated by the plurality of magnets.